King County Environmental Lab Analytical Report

PROJECT: 423056-160	Locator: Grent Loc. Sampled: Lab ID: Natrix: % Solids:	NFK501 Norfolk CSO out? Apr 23, 1999 L15421-1 SALTWTRSED 76.9	NFK501 Norlok CSO outall channet, inshore Apr 23, 1999 LI5421-1 SALTWIRSED 76,9		Locator: Client Loc: E Sampled: A Lab ID: L Matrix: S % Solids: 7	NFH502 End of Norfolk CSC outfall channel Apr 23, 1999 L15421-2 SALTWTRSED	CS6 outfall	channel	Locator Client Loc: Samped: Lab IÜ Matrix % Solds:	NFK503 End of Boeing som cain channel Apr 23, 1999 L15421-3 SALTWTRSED	g storm dain g SED	channel	Locator: Client Lcc: Samplec: Lab ID: Matrix: % Solids:	NFK504 Upriver ofCSO & Apr 23, 1999 L15421-4 SALTWIRSED 77.6	NFK504 Upriver ofCSO & storm drain channe Apr 23, 1999 L15421-4 SALTWIRSED	hanne
Parameters	Value	Qual - Dry	MDL RDL - Dry Weight Basis	บกเร	Value	Oual · Dry	MDL R · Dry Weight Basis	RDL Units	Vaue	Qual	MDL R	RDL Urits	Value	Oua)	MDL RDL Dry Weight Basis	Units
COMBINED LABS																
M=CV AST& D422 D+0.00 *	ю 69		0.1	%	က		0.1	%			0.1	δQ	8.3		0.1	*
p+1.00 *	38		0.1	- %	32		0.1	%	28		0.1	ક્ષ	44		0.1	%
p+10.0 *		NDI ∨	0.1	ર્જ		¢ΜD£	0.1	%		JCM>	0.1	ô		~WDL	0.1	%
p+10.0(more than) *		<mdl< td=""><td>0.1</td><td>%</td><td></td><td>ΨDΓ</td><td>0.1</td><td>%</td><td></td><td>TCW></td><td>0.1</td><td>o^Q</td><td></td><td>≺MDL</td><td>0.1</td><td>% 3</td></mdl<>	0.1	%		ΨDΓ	0.1	%		TCW>	0.1	o ^Q		≺MDL	0.1	% 3
p+2.00 *	46		0.1	%	999		0.1	%	55		0.1	84	46		0.1	* 7
p+3.00 *	4.3		0.1	%	4		0.1	%	ð		1.0	89	m		0.1	*
p+4.00 *	7		0.1	ا ⁹ %	4.0		0.1	%	1.3		0.1	bQ 8	0.4		0.1	s* 2
p+5.00 *	-		0.1	8 3	4.7		-	8 8	4.0		0.1	5 ^Q 2	2.9		2 6	× 8
p+6.00 *		<mdl< td=""><td>0.1</td><td>se ;</td><td></td><td>4MDE</td><td>0.1</td><td>%</td><td></td><td>JCM></td><td>0.1</td><td>SQ E</td><td></td><td>- WED</td><td></td><td>K 8</td></mdl<>	0.1	se ;		4MDE	0.1	%		JCM>	0.1	SQ E		- WED		K 8
p+1.00 *		<mol< td=""><td>0.1</td><td>8</td><td></td><td>.MDE</td><td>0.1</td><td>8</td><td></td><td>-W.J.L</td><td>0.1</td><td>50 5</td><td></td><td>\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \</td><td>- C</td><td>š č</td></mol<>	0.1	8		.MDE	0.1	8		-W.J.L	0.1	50 5		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	- C	š č
p+8.00 *		<mdl< td=""><td>0.1</td><td>% ;</td><td></td><td>₩DF</td><td>0.1</td><td>8</td><td></td><td>JCM></td><td>L'.</td><td>5^Q 1</td><td></td><td>JON S</td><td>5 6</td><td>× a</td></mdl<>	0.1	% ;		₩DF	0.1	8		JCM>	L'.	5 ^Q 1		JON S	5 6	× a
p+9.00.*		VMDL ∨MDL	0.1	8 8		\$PF	1.0	8		₹	L.O	Q E		V	- 6	× 8
p-1.00 *	8.0	ш	0.1	8	0.4	ш	0.1	%	4.0	ĺ	L.D	SQ	D.4		- c	ž ò
p-2.00 *		<mdl< td=""><td>0.1</td><td>ે^ર</td><td></td><td>åD₽;</td><td>0.1</td><td>%</td><td></td><td>-WDL</td><td>1.0</td><td>žą į</td><td></td><td>-WDL</td><td></td><td>s 2</td></mdl<>	0.1	ે ^ર		åD₽;	0.1	%		-WDL	1.0	žą į		-WDL		s 2
p-2.00(less than) *		<mdl< td=""><td>0.1</td><td>%</td><td></td><td>\$4DF</td><td>0.1</td><td>%</td><td></td><td>JCW></td><td>0.1</td><td>p_Q</td><td></td><td><mdl< td=""><td>0.1</td><td>*</td></mdl<></td></mdl<>	0.1	%		\$4DF	0.1	%		JCW>	0.1	p _Q		<mdl< td=""><td>0.1</td><td>*</td></mdl<>	0.1	*
M=CV SMZ40-G (03-01-00'-001)						·							i		100	ì
Total Soids *	76.9		0.005 0.01	8	77.4		0.005	0.01 %	,		200.0	φ, L0.0	977		0.00	
M=CV SM5310-B (03-04-00)-000)	ļ		,	3	,			1	0010				1350		6.4 13.6	12 9 20163
Total Organic Carbon	1760		6.0	mg/kg	1210		6.5	12.9 mg/kg			0	10 m	0671			5
M=ES NONE	•			{	3 0			8	2.5			c	0.3			F
Sample Jeptin	7 000			= 1	2.4			<u>ا</u>	1254			: 1	1123			
Sample start lime "	1300			- 000	4000			- 0	ľ			0000	26000			HOLE
Salinping interned	00007				20000			5 5				E.J	16			5
Sediment Sampling Deput	308/30			3 6	30N30			1 2				nche	301130			note
Tidal Condition	36N30			2000	T T			9000	1			non				noie
Tide Height	7 7			2 =	7 ~			=				=	5.6			Œ
M=MT EP/ 245.5 (06-01-001-001)	2										İ					
Mercury Total CVA	0.055	-RDL	0.026 0.259	mg/Kg	0.089	âDL	0.026	0.257 mg/Kg	990.0	- <rjl< td=""><td>0 026</td><td>0.26 mg/Kg</td><td>0.372</td><td><rdi.< td=""><td>0.026 0.254</td><td>t mg/kg</td></rdi.<></td></rjl<>	0 026	0.26 mg/Kg	0.372	<rdi.< td=""><td>0.026 0.254</td><td>t mg/kg</td></rdi.<>	0.026 0.254	t mg/kg
M=MT EP/3656A/6010B (6)-20-004-002)											:					
Aluminun, Total, ICP	9770	1	6.5 32 5	32 £ mg/Kg	9730	_	6.2	31.3 mg/Kg	9420			31.8 mg/Kg	9330			
Arsenic, Total, ICP		<mdl< td=""><td>3.3 16.3</td><td>mg/Kg</td><td>3.7</td><td>«RDL</td><td>3.1</td><td>15.6 mg/Kg</td><td></td><td>- (</td><td></td><td>16 mg/Kg</td><td></td><td></td><td></td><td></td></mdl<>	3.3 16.3	mg/Kg	3.7	«RDL	3.1	15.6 mg/Kg		- (16 mg/Kg				
Berylliun Total, ICP	0.11	<rdl< td=""><td></td><td>0.32£ mg/Kg</td><td>0.14</td><td>ÅDL JOW</td><td></td><td>0.313 mg/Kg</td><td>0.11</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></rdl<>		0.32£ mg/Kg	0.14	ÅDL JOW		0.313 mg/Kg	0.11							
Cadmium, Total, ICP	0.2	<rdl,< td=""><td></td><td>0.577 mg/Kg</td><td>0.21</td><td><rdl.l< td=""><td></td><td>0.93B mg/Kg</td><td></td><td><mdl.l< td=""><td></td><td>0.955 mg/Kg</td><td></td><td><rdl.< td=""><td>٦ </td><td></td></rdl.<></td></mdl.l<></td></rdl.l<></td></rdl,<>		0.577 mg/Kg	0.21	<rdl.l< td=""><td></td><td>0.93B mg/Kg</td><td></td><td><mdl.l< td=""><td></td><td>0.955 mg/Kg</td><td></td><td><rdl.< td=""><td>٦ </td><td></td></rdl.<></td></mdl.l<></td></rdl.l<>		0.93B mg/Kg		<mdl.l< td=""><td></td><td>0.955 mg/Kg</td><td></td><td><rdl.< td=""><td>٦ </td><td></td></rdl.<></td></mdl.l<>		0.955 mg/Kg		<rdl.< td=""><td>٦ </td><td></td></rdl.<>	٦	
Chromium, Total, ICF	12.9		0.33 1.62	1 63 mg/Kg	13		031	1.56 mg/Kg				16 mg/Kg	12.2			
Copper, Total, ICP	11.4		0.26 1.3	1.3 mg/Kg	12.2			1.25 mg/Kg				1.27 mg/Kg			- }	3 mg/kg
Iron, Total, ICP	18900	æ	3.3 16.3	16.3 mg/Kg	19800	В		31.3 ng/Kg			;; ;;	16 mg/Kg	138			3 mg/kg
Lead, Total, ICP	4.2	<rdi.< td=""><td>2 9.77</td><td>9.77 mg/Kg</td><td>5</td><td>RDL</td><td>6.</td><td>9.38 mg/Kg</td><td></td><td>⊽` i</td><td></td><td>9.55 mç/Kg</td><td></td><td>Ÿ</td><td></td><td>mg#g</td></rdi.<>	2 9.77	9.77 mg/Kg	5	RDL	6.	9.38 mg/Kg		⊽` i		9.55 mç/Kg		Ÿ		mg#g
Mangansse, Total, ICP	263	၅		0.651 mg/Kg	226	ŋ		0.625 mg/Kg	ļ	9		0.636 mç/Kg	2	0	١,	g way
Nickel, Total, ICP	12.7			6.51 mg/Kg	12.9			6.25 mg/Kg	12.6		2	6.36 mç/Kg	12.9			
Seleniun, Total, ICP		~MDL	Ì	16.3 mg/Kg		•MDL		15.6 mg/Kg		<mde< td=""><td>0</td><td></td><td></td><td>VMDI.</td><td></td><td></td></mde<>	0			VMDI.		
Silver, Total, ICP		~MDL		1.3 mg/Kg		•MDL	İ	125 mg/Kg		OWD!	0.24	1.27 mg/Kg		JOW S		E I
Thallium, Total, ICP	:	70₩>	65.1	mg/Kg		ŶMD!				<mul< td=""><td>ા ડા</td><td>63.6 mg/Kg</td><td>6.77</td><td>10MV</td><td>031 153</td><td>1.53 mo.Ko</td></mul<>	ા ડા	63.6 mg/Kg	6.77	10MV	031 153	1.53 mo.Ko
Zinc, Toal, ICP	46		0.33 1.62	mg/Kg	43.2		031	1.56 mg/kg	42.1		0.52	gwgm a.r				
									C:000						Page 1	7,3

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Data Management and Analysis Section Comprehersive Report #8952

King County Environmental Lab Analytical Report

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PROJEU I: 423056-160	Locator: Client Loc: Sampled: Lab ID: Matrix: % Solids:	NFK501 Perfolk CSO outail channel, inshore Apr 23, 1999 L15421-1 SALTV/TRSED 76.9	oufall channe 9 ED		Locator: Client Loc: Sampled: Lab ID: Matrix: % Solids:	NF <502 End of Norfolk CSD outfall channel Apr 23, 1999 L15421-2 SALTWTRSED 77,4	CS0 outfal	If channel	Locabr: Client Loc: Sampled: Lab ID: Matrix: % Soids;	NFK503 End of Boeing storm train channel Apr 23, 1999 L15421-3 SALTWTRSED	g storm trai 9 ED	n channel	Locator: Client Loc: Sampled: Lab ID: Matrix: % Solids	NFK504 Upriver of CSO & storm drain channel Apr 23, 1999 L15421-4 SALTW-RSED 77.6	S & storm o	drain cha	lenna
Parameters	Value	Qual - Dry	MDL RI - Dry Weight Basis	RDL Units	Value	Qual - Dry V	MBL R - Dry Weight Basis	RDL Units	Value	Qual Dry	MDL R Dry Weight Basis	RDL Units	Value	Oual Dy	MIDIL R Dry Weight Bass	DF.	Units
COMBINED LABS M=OR EPA 3550BB082 (73.03.002)																	
Aroclor 1016		<mdl< td=""><td></td><td></td><td></td><td>-MOL</td><td>22</td><td>43 Jg/Kg</td><td>_</td><td><mdl< td=""><td>22</td><td>43.2 ug.Kg</td><td></td><td><mdl< td=""><td>22</td><td>42.9</td><td>ug/Kg</td></mdl<></td></mdl<></td></mdl<>				-MOL	22	43 Jg/Kg	_	<mdl< td=""><td>22</td><td>43.2 ug.Kg</td><td></td><td><mdl< td=""><td>22</td><td>42.9</td><td>ug/Kg</td></mdl<></td></mdl<>	22	43.2 ug.Kg		<mdl< td=""><td>22</td><td>42.9</td><td>ug/Kg</td></mdl<>	22	42.9	ug/Kg
Aroclor 1221		√M DF				-WDL	22	43 Jg/Kg		≺MDΓ	27	43.2 ug/Kg		<mdl< td=""><td>22</td><td>42.9</td><td>ug/Ke</td></mdl<>	22	42.9	ug/Ke
Araclor 1232		-MDL				<mdl< td=""><td>22</td><td></td><td></td><td><md.< td=""><td>22</td><td></td><td></td><td><mdl< td=""><td>22</td><td>42.9</td><td>ug/Kç</td></mdl<></td></md.<></td></mdl<>	22			<md.< td=""><td>22</td><td></td><td></td><td><mdl< td=""><td>22</td><td>42.9</td><td>ug/Kç</td></mdl<></td></md.<>	22			<mdl< td=""><td>22</td><td>42.9</td><td>ug/Kç</td></mdl<>	22	42.9	ug/Kç
Aroclor 1242		-MDL	22			⋄M Di.	22	43 Jg/Kg		<mdl< td=""><td>22</td><td></td><td></td><td>TGW></td><td>22</td><td></td><td>ug/Kç</td></mdl<>	22			TGW>	22		ug/Kç
Aroclor 1248		-WDI		- 1		⊹M D L	22			< M DF	22			-WDL	22		ùg/K€
Aroclor 1254		- MDL				<mdl< td=""><td>22</td><td>- 1</td><td></td><td><mdl< td=""><td>22</td><td>- 1</td><td></td><td><wdl< td=""><td>22</td><td>- 1</td><td>ug/Kç</td></wdl<></td></mdl<></td></mdl<>	22	- 1		<mdl< td=""><td>22</td><td>- 1</td><td></td><td><wdl< td=""><td>22</td><td>- 1</td><td>ug/Kç</td></wdl<></td></mdl<>	22	- 1		<wdl< td=""><td>22</td><td>- 1</td><td>ug/Kç</td></wdl<>	22	- 1	ug/Kç
Arociof 1250		- MIDI	7	43.3 ug/kg		- ×MDL	22	43 rg/Kg		-WDF	22	43.2 ug.Kg		<wdf< td=""><td>22</td><td>42.9</td><td>ng/Kç</td></wdf<>	22	42.9	ng/Kç
1,2-Diptenylhydrazine		<mdl< td=""><td>59</td><td>139 ug/Kg</td><td></td><td>(MD)</td><td>68</td><td>138 Jo/Kg</td><td></td><td>[QM]></td><td>RC</td><td>179 un Ka</td><td></td><td>ĭŒV</td><td>89</td><td>138</td><td>in/K</td></mdl<>	59	139 ug/Kg		(MD)	68	138 Jo/Kg		[Q M]>	RC	179 un Ka		ĭŒV	89	138	in/K
2,4,5-Trchloropheno	4.	<mdl,g< td=""><td></td><td></td><td></td><td><wdl.g< td=""><td>.40</td><td></td><td></td><td><mct. g<="" td=""><td>145</td><td></td><td></td><td><mdl.6< td=""><td>140</td><td></td><td>uo/Ka</td></mdl.6<></td></mct.></td></wdl.g<></td></mdl,g<>				<wdl.g< td=""><td>.40</td><td></td><td></td><td><mct. g<="" td=""><td>145</td><td></td><td></td><td><mdl.6< td=""><td>140</td><td></td><td>uo/Ka</td></mdl.6<></td></mct.></td></wdl.g<>	.40			<mct. g<="" td=""><td>145</td><td></td><td></td><td><mdl.6< td=""><td>140</td><td></td><td>uo/Ka</td></mdl.6<></td></mct.>	145			<mdl.6< td=""><td>140</td><td></td><td>uo/Ka</td></mdl.6<>	140		uo/Ka
2,4,6-Trchloropheno		<mdl.g< td=""><td></td><td></td><td></td><td><wdl,g< td=""><td>,40</td><td></td><td></td><td><mcl.g< td=""><td>14(</td><td></td><td></td><td><mdl,6< td=""><td>140</td><td>1</td><td>ug/Kg</td></mdl,6<></td></mcl.g<></td></wdl,g<></td></mdl.g<>				<wdl,g< td=""><td>,40</td><td></td><td></td><td><mcl.g< td=""><td>14(</td><td></td><td></td><td><mdl,6< td=""><td>140</td><td>1</td><td>ug/Kg</td></mdl,6<></td></mcl.g<></td></wdl,g<>	,40			<mcl.g< td=""><td>14(</td><td></td><td></td><td><mdl,6< td=""><td>140</td><td>1</td><td>ug/Kg</td></mdl,6<></td></mcl.g<>	14(<mdl,6< td=""><td>140</td><td>1</td><td>ug/Kg</td></mdl,6<>	140	1	ug/Kg
2,4-Dichlorophenol		<mdl,g< td=""><td>35 6</td><td>69.3 ug/Kg</td><td></td><td><#NDL,G</td><td>35</td><td>68.9 g/Kg</td><td></td><td><mcl g<="" td=""><td>36</td><td>69.2 ug.Kg</td><td>-</td><td><mdl.6< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl.6<></td></mcl></td></mdl,g<>	35 6	69.3 ug/Kg		<#NDL,G	35	68.9 g/Kg		<mcl g<="" td=""><td>36</td><td>69.2 ug.Kg</td><td>-</td><td><mdl.6< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl.6<></td></mcl>	36	69.2 ug.Kg	-	<mdl.6< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl.6<>	35	68.7	ug/Kg
2,4-Dimethylphenol		≺MDL G.X				<mdl,g.x< td=""><td>35</td><td>68.9 Jg/Kg</td><td></td><td><mdl,g,x< td=""><td>3,5</td><td>69.2 ug.Kg</td><td></td><td><mdl gx<="" td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl></td></mdl,g,x<></td></mdl,g.x<>	35	68.9 Jg/Kg		<mdl,g,x< td=""><td>3,5</td><td>69.2 ug.Kg</td><td></td><td><mdl gx<="" td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl></td></mdl,g,x<>	3,5	69.2 ug.Kg		<mdl gx<="" td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl>	35	68.7	ug/Kg
2,4-Dinirophenol		<mdt,g< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td><m□l,g< td=""><td>39</td><td></td><td></td><td><mdl,6< td=""><td>68</td><td></td><td>ug/Kg</td></mdl,6<></td></m□l,g<></td></mdt,g<>								<m□l,g< td=""><td>39</td><td></td><td></td><td><mdl,6< td=""><td>68</td><td></td><td>ug/Kg</td></mdl,6<></td></m□l,g<>	39			<mdl,6< td=""><td>68</td><td></td><td>ug/Kg</td></mdl,6<>	68		ug/Kg
2,4-Dinirotoluene		-WOL				<mdt.< td=""><td></td><td></td><td></td><td><mdl< td=""><td>7</td><td>- 1</td><td></td><td>JGW></td><td>4</td><td>- !</td><td>υg/Kg</td></mdl<></td></mdt.<>				<mdl< td=""><td>7</td><td>- 1</td><td></td><td>JGW></td><td>4</td><td>- !</td><td>υg/Kg</td></mdl<>	7	- 1		J GW >	4	- !	υg/Kg
2,6-Dinfrotokuene		- WDF		- 1		¢MDL	4.			<mdl< td=""><td>4</td><td></td><td></td><td>\dw></td><td>4</td><td></td><td>ug/Kg</td></mdl<>	4			\dw>	4		ug/Kg
2-Chlorenaphthalene		<mde< td=""><td></td><td></td><td></td><td><mdl< td=""><td></td><td></td><td></td><td><mdl< td=""><td>51</td><td>- 1</td><td></td><td>TOW></td><td>21</td><td></td><td>ug/Kg</td></mdl<></td></mdl<></td></mde<>				<mdl< td=""><td></td><td></td><td></td><td><mdl< td=""><td>51</td><td>- 1</td><td></td><td>TOW></td><td>21</td><td></td><td>ug/Kg</td></mdl<></td></mdl<>				<mdl< td=""><td>51</td><td>- 1</td><td></td><td>TOW></td><td>21</td><td></td><td>ug/Kg</td></mdl<>	51	- 1		TOW>	21		ug/Kg
2-Chiorophenol		S C C	69	139 ug/Kg			68	- 1		<mcl g<="" td=""><td>36</td><td></td><td></td><td>× • </td><td>88</td><td>- 1</td><td>ug/Kg</td></mcl>	36			× •	88	- 1	ug/Kg
2-Methynaphinaene		O TOTAL		ומיעט		ANDE, G	36	gaylar col		VMCL'G	ដ	Bysh to		AMDL'6	200	50.7	SV/Si
2-Nitroanline		~WDL	1	- 1		SMDI.		- 1		S. HILL G	147			< MDI	340		ug/ng
2-Nitrophenol		<mdl,g< td=""><td></td><td>1</td><td></td><td><mdl,g< td=""><td>35</td><td></td><td></td><td><mcl.g< td=""><td>36</td><td></td><td></td><td><mdl,6< td=""><td>35</td><td>1</td><td>ug/Kg</td></mdl,6<></td></mcl.g<></td></mdl,g<></td></mdl,g<>		1		<mdl,g< td=""><td>35</td><td></td><td></td><td><mcl.g< td=""><td>36</td><td></td><td></td><td><mdl,6< td=""><td>35</td><td>1</td><td>ug/Kg</td></mdl,6<></td></mcl.g<></td></mdl,g<>	35			<mcl.g< td=""><td>36</td><td></td><td></td><td><mdl,6< td=""><td>35</td><td>1</td><td>ug/Kg</td></mdl,6<></td></mcl.g<>	36			<mdl,6< td=""><td>35</td><td>1</td><td>ug/Kg</td></mdl,6<>	35	1	ug/Kg
3,3'-Dichlorobenzidine		<mdlx< td=""><td>35 6</td><td>69.3 ug/Kg</td><td></td><td><td>35</td><td>68.9 Jg/Kg</td><td></td><td><mcl.x< td=""><td>36</td><td></td><td></td><td><mdl,x< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,x<></td></mcl.x<></td></td></mdlx<>	35 6	69.3 ug/Kg		<td>35</td> <td>68.9 Jg/Kg</td> <td></td> <td><mcl.x< td=""><td>36</td><td></td><td></td><td><mdl,x< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,x<></td></mcl.x<></td>	35	68.9 Jg/Kg		<mcl.x< td=""><td>36</td><td></td><td></td><td><mdl,x< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,x<></td></mcl.x<>	36			<mdl,x< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,x<>	35	68.7	ug/Kg
3-Nitroaviline		<mdl,g< td=""><td></td><td>20% ug/Kg</td><td></td><td><mdl.g< td=""><td>40</td><td>207 ıg/Kg</td><td></td><td><mdl.g< td=""><td>14C</td><td>208 ug.Kg</td><td></td><td><mdl.6< td=""><td>140</td><td>206</td><td>ug/Kg</td></mdl.6<></td></mdl.g<></td></mdl.g<></td></mdl,g<>		20% ug/Kg		<mdl.g< td=""><td>40</td><td>207 ıg/Kg</td><td></td><td><mdl.g< td=""><td>14C</td><td>208 ug.Kg</td><td></td><td><mdl.6< td=""><td>140</td><td>206</td><td>ug/Kg</td></mdl.6<></td></mdl.g<></td></mdl.g<>	40	207 ıg/Kg		<mdl.g< td=""><td>14C</td><td>208 ug.Kg</td><td></td><td><mdl.6< td=""><td>140</td><td>206</td><td>ug/Kg</td></mdl.6<></td></mdl.g<>	14C	208 ug.Kg		<mdl.6< td=""><td>140</td><td>206</td><td>ug/Kg</td></mdl.6<>	140	206	ug/Kg
4,6-Dinito-O-Cresof		<mdl,g< td=""><td></td><td>- 1</td><td></td><td><mdl,g< td=""><td>j</td><td>- 1</td><td></td><td>9'TGW></td><td>39</td><td></td><td></td><td><mdl.6< td=""><td>68</td><td></td><td>ug/Kg</td></mdl.6<></td></mdl,g<></td></mdl,g<>		- 1		<mdl,g< td=""><td>j</td><td>- 1</td><td></td><td>9'TGW></td><td>39</td><td></td><td></td><td><mdl.6< td=""><td>68</td><td></td><td>ug/Kg</td></mdl.6<></td></mdl,g<>	j	- 1		9'TGW>	39			<mdl.6< td=""><td>68</td><td></td><td>ug/Kg</td></mdl.6<>	68		ug/Kg
4-Bromcphenyl Phenyl Ether		<mdl → MDL</mdl 				¢MDL				JCM>	4			\dWD 	4:		ug/Kg
4-Chlorcapiline		AMDL, G	B @	139 ug/Kg		AMDL,G	89	138 ug/Kg		SWDL'G	59 29	139 ugiKg		<mul.6< td=""><td>80 8</td><td>138</td><td>ug/Kg</td></mul.6<>	80 8	138	ug/Kg
4-Chlorophenyl Phenyl Ether		√WDL	'			-(WDL	İ			- M⊃L	21			1GW>	2	1	uq/Ka
4-Methyphenol		<mdl,g< td=""><td></td><td>69 : ug/Kg</td><td></td><td><mdl,g< td=""><td></td><td></td><td></td><td><mdl,g< td=""><td>35</td><td></td><td></td><td><mdf 6<="" td=""><td>35</td><td></td><td>ug/Kg</td></mdf></td></mdl,g<></td></mdl,g<></td></mdl,g<>		69 : ug/Kg		<mdl,g< td=""><td></td><td></td><td></td><td><mdl,g< td=""><td>35</td><td></td><td></td><td><mdf 6<="" td=""><td>35</td><td></td><td>ug/Kg</td></mdf></td></mdl,g<></td></mdl,g<>				<mdl,g< td=""><td>35</td><td></td><td></td><td><mdf 6<="" td=""><td>35</td><td></td><td>ug/Kg</td></mdf></td></mdl,g<>	35			<mdf 6<="" td=""><td>35</td><td></td><td>ug/Kg</td></mdf>	35		ug/Kg
4-Nitroauline		<mdl,g< td=""><td></td><td> </td><td></td><td><mdl.g< td=""><td>140</td><td>207 ug/Kg</td><td></td><td><mdl,g< td=""><td>140</td><td>208 ug/Kg</td><td></td><td><mdf 6<="" td=""><td>140</td><td> </td><td>ug/Kg</td></mdf></td></mdl,g<></td></mdl.g<></td></mdl,g<>				<mdl.g< td=""><td>140</td><td>207 ug/Kg</td><td></td><td><mdl,g< td=""><td>140</td><td>208 ug/Kg</td><td></td><td><mdf 6<="" td=""><td>140</td><td> </td><td>ug/Kg</td></mdf></td></mdl,g<></td></mdl.g<>	1 40	207 ug/Kg		<mdl,g< td=""><td>140</td><td>208 ug/Kg</td><td></td><td><mdf 6<="" td=""><td>140</td><td> </td><td>ug/Kg</td></mdf></td></mdl,g<>	140	208 ug/Kg		<mdf 6<="" td=""><td>140</td><td> </td><td>ug/Kg</td></mdf>	140		ug/Kg
4-Nitropnenol		<mdl,g< td=""><td></td><td>- 1</td><td></td><td><mdl.g< td=""><td>İ</td><td></td><td></td><td><mdl,g< td=""><td>99</td><td></td><td></td><td><mdl 6<="" td=""><td>88</td><td></td><td>ug/Kg</td></mdl></td></mdl,g<></td></mdl.g<></td></mdl,g<>		- 1		<mdl.g< td=""><td>İ</td><td></td><td></td><td><mdl,g< td=""><td>99</td><td></td><td></td><td><mdl 6<="" td=""><td>88</td><td></td><td>ug/Kg</td></mdl></td></mdl,g<></td></mdl.g<>	İ			<mdl,g< td=""><td>99</td><td></td><td></td><td><mdl 6<="" td=""><td>88</td><td></td><td>ug/Kg</td></mdl></td></mdl,g<>	99			<mdl 6<="" td=""><td>88</td><td></td><td>ug/Kg</td></mdl>	88		ug/Kg
Acenaphthene		<mdt< td=""><td></td><td></td><td></td><td>-MDL</td><td></td><td></td><td></td><td>JCM></td><td>4</td><td></td><td></td><td><mdl< td=""><td>4</td><td></td><td>ug/Kg</td></mdl<></td></mdt<>				-MDL				JCM>	4			<mdl< td=""><td>4</td><td></td><td>ug/Kg</td></mdl<>	4		ug/Kg
Acenaphthylene		<pre></pre>	21 3	34 / ug/Kg		WOL.				MJL × 1344	21		-		21	34.4	ug/Kg
Anthracena		V 10 10 10 10 10 10 10 10 10 10 10 10 10		13% ug/kg		ANDL, A	24	130 1g/Ng		VILL'Y	3 8	139 uging		AMDE, A	2 50		ugh Ng
Benzidire		× ICIN			-	× IUN×	ł			X ICAV	836			S JOHN	820	- 1	X/Un
Benzolalanthracene		SMDI G								CATA CATA	3 5			W CMD	2 2		, y
Benzo(a)pyrene		<mdl.g< td=""><td>į</td><td>1</td><td></td><td>D IGW∀</td><td></td><td></td><td></td><td>S ICIN</td><td>3 88</td><td></td><td></td><td><mdl g<="" td=""><td>35</td><td>- 1</td><td>y X</td></mdl></td></mdl.g<>	į	1		D IGW∀				S ICIN	3 88			<mdl g<="" td=""><td>35</td><td>- 1</td><td>y X</td></mdl>	35	- 1	y X
Benzo (billuoranthene		≺MDL				¢MDL				S IZW∨	95			N>	55		ug/Ka
Benzo(gh,i)perylene		<mdl,g< td=""><td>-</td><td>1</td><td>75.7</td><td>9</td><td></td><td></td><td></td><td><mdl,g< td=""><td>35</td><td>1</td><td>70.5</td><td></td><td>35</td><td></td><td>ug/Kg</td></mdl,g<></td></mdl,g<>	-	1	75.7	9				<mdl,g< td=""><td>35</td><td>1</td><td>70.5</td><td></td><td>35</td><td></td><td>ug/Kg</td></mdl,g<>	35	1	70.5		35		ug/Kg
Benzo(kifluoranthene		-\MDL		104 ug/Kg		-MDL	99	103 ug/Kg		<m⊃l< td=""><td>99</td><td>104 ug/Kg</td><td>ì</td><td>¬WDГ</td><td>55</td><td></td><td>ug/Kg</td></m⊃l<>	99	104 ug/Kg	ì	¬WDГ	55		ug/Kg
Benzoic Acid		<mdl,g< td=""><td></td><td></td><td></td><td><mdl,g< td=""><td></td><td></td><td></td><td><mdl,g< td=""><td>140</td><td>- 1</td><td></td><td><mdl,6< td=""><td>140</td><td></td><td>ug/Kg</td></mdl,6<></td></mdl,g<></td></mdl,g<></td></mdl,g<>				<mdl,g< td=""><td></td><td></td><td></td><td><mdl,g< td=""><td>140</td><td>- 1</td><td></td><td><mdl,6< td=""><td>140</td><td></td><td>ug/Kg</td></mdl,6<></td></mdl,g<></td></mdl,g<>				<mdl,g< td=""><td>140</td><td>- 1</td><td></td><td><mdl,6< td=""><td>140</td><td></td><td>ug/Kg</td></mdl,6<></td></mdl,g<>	140	- 1		<mdl,6< td=""><td>140</td><td></td><td>ug/Kg</td></mdl,6<>	140		ug/Kg
Benzyl Acohol		<mdl.g< td=""><td>35 6</td><td>69.3 ug/Kg</td><td></td><td><mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td></td><td><mdl,g< td=""><td>35</td><td>69.2 ug/Kg</td><td></td><td><mdl,6< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,6<></td></mdl,g<></td></mdl,g<></td></mdl.g<>	35 6	69.3 ug/Kg		<mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td></td><td><mdl,g< td=""><td>35</td><td>69.2 ug/Kg</td><td></td><td><mdl,6< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,6<></td></mdl,g<></td></mdl,g<>	35	68.9 ug/Kg		<mdl,g< td=""><td>35</td><td>69.2 ug/Kg</td><td></td><td><mdl,6< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,6<></td></mdl,g<>	35	69.2 ug/Kg		<mdl,6< td=""><td>35</td><td>68.7</td><td>ug/Kg</td></mdl,6<>	35	68.7	ug/Kg

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King County Environmental Lab Analytical Report

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PROJECT: 423056-160	Locator:	NFK501) () () () () () () () () () (Locator:	NFK502	9	la de de la constante de la co	Locabr.	NFK593 End officeing storm drain channel	otore drain	9	Locator: Client Lec:	NFK504 Trainer Africo & storm drain rhannal	S etnem des	Toedh nie	9
	Sampled:	Apr 23 1999	rall charlin	9 0 0	Sampled	Apr 23, 1999	can odi	all cramma	Samded	Apr 23, 1999		<u>.</u>	Sampled	Apr 23, 1999		3	<u> </u>
	Lab ID:	L15421-1			Lat 1D:	L15421-2			Lab (D:	L15421-3			tab (D:	L15421-4			
	Matrix:	SALTWTRSED	0		Marrix	SALTWTRSED	Q.		Matri):	SALTWTRSED	0.		Matrix	SALTWIRSED	_		
	% Solids:	76.9			% Solids:	77.4			:spios %	11			% Solids:	77.6			
Parameers	Value	Qual	MDLR	RDL Units	/alue	Qual	MOL	RDL Units	Value	o o	MDL R	RDL Units	Vatue	Qual	MDL R	RDL U	Units
COMBINED LABS		* ś.	- Dry viergini basila			5	CITY AND THE CASE	4		5							
Benzyl Butyl Phthalate		<mdl< td=""><td>21</td><td>34.7 ug/Kg</td><td></td><td>MDL</td><td>21</td><td>34.5 ug/Kg</td><td>_</td><td><mdl< td=""><td>2.</td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td></td><td></td><td>αg/Kg</td></mdl<></td></mdl<></td></mdl<>	21	34.7 ug/Kg		M DL	21	34.5 ug/Kg	_	<mdl< td=""><td>2.</td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td></td><td></td><td>αg/Kg</td></mdl<></td></mdl<>	2.	34.7 ug'Kg		<mdl< td=""><td></td><td></td><td>αg/Kg</td></mdl<>			αg/Kg
Bis(2-Ciloroethoxy)Nethane		<mdl,g< td=""><td>35</td><td>69.1 ug/Kg</td><td></td><td></td><td>35</td><td>68.9 ug/Kg</td><td></td><td><mcl,g< td=""><td>35</td><td>69.2 ug'Kg</td><td></td><td><mdl,6< td=""><td>1</td><td>•</td><td>ug/Kg</td></mdl,6<></td></mcl,g<></td></mdl,g<>	35	69.1 ug/Kg			35	68.9 ug/Kg		<mcl,g< td=""><td>35</td><td>69.2 ug'Kg</td><td></td><td><mdl,6< td=""><td>1</td><td>•</td><td>ug/Kg</td></mdl,6<></td></mcl,g<>	35	69.2 ug'Kg		<mdl,6< td=""><td>1</td><td>•</td><td>ug/Kg</td></mdl,6<>	1	•	ug/Kg
Bis(2-Chloroethyl)Etrer		<mdl,g< td=""><td></td><td>34.7 ug/Kg</td><td></td><td><mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td></td><td><mcl,g< td=""><td>2.</td><td>34.7 ug'Kg</td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<></td></mdl,g<>		34.7 ug/Kg		<mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td></td><td><mcl,g< td=""><td>2.</td><td>34.7 ug'Kg</td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<>	21	34.5 ug/Kg		<mcl,g< td=""><td>2.</td><td>34.7 ug'Kg</td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<>	2.	34.7 ug'Kg		<mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<>			ug/Kg
Bis(2-Chloroisopropy)Ether		<mdl,g< td=""><td>69</td><td>139 ug/Kg</td><td></td><td><mdl.g< td=""><td>68</td><td>138 ug/Kg</td><td></td><td><mcl,g< td=""><td>69</td><td>139 ug'Kg</td><td></td><td><mdl.s< td=""><td></td><td></td><td>ug/Kg</td></mdl.s<></td></mcl,g<></td></mdl.g<></td></mdl,g<>	69	139 ug/Kg		<mdl.g< td=""><td>68</td><td>138 ug/Kg</td><td></td><td><mcl,g< td=""><td>69</td><td>139 ug'Kg</td><td></td><td><mdl.s< td=""><td></td><td></td><td>ug/Kg</td></mdl.s<></td></mcl,g<></td></mdl.g<>	68	138 ug/Kg		<mcl,g< td=""><td>69</td><td>139 ug'Kg</td><td></td><td><mdl.s< td=""><td></td><td></td><td>ug/Kg</td></mdl.s<></td></mcl,g<>	69	139 ug'Kg		<mdl.s< td=""><td></td><td></td><td>ug/Kg</td></mdl.s<>			ug/Kg
Bis(2-Etrythexyl)Phtralate		-MDL	21	34. ug/Kg		< M DL	21	34.5 ug/Kg		<mdl< td=""><td></td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td>- 1</td><td>- 1</td><td>ug/Kg</td></mdl<></td></mdl<>		34.7 ug'Kg		<mdl< td=""><td>- 1</td><td>- 1</td><td>ug/Kg</td></mdl<>	- 1	- 1	ug/Kg
Caffeine		<mdl< td=""><td>6.9</td><td>34.7 ug/Kg</td><td></td><td>MDL</td><td>3.8</td><td>34.5 ug/Kg</td><td></td><td><mdl< td=""><td></td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td>Ì</td><td></td><td>ug/Kg</td></mdl<></td></mdl<></td></mdl<>	6.9	34.7 ug/Kg		MDL	3.8	34.5 ug/Kg		<mdl< td=""><td></td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td>Ì</td><td></td><td>ug/Kg</td></mdl<></td></mdl<>		34.7 ug'Kg		<mdl< td=""><td>Ì</td><td></td><td>ug/Kg</td></mdl<>	Ì		ug/Kg
Carbazole		≺MDL	35	69.1 ug/Kg		- MDF	35	68.9 ug/Kg		<mdl< td=""><td></td><td>69.2 ug'Kg</td><td></td><td>-\MDL</td><td></td><td>- 1</td><td>ug/Kg</td></mdl<>		69.2 ug'Kg		-\MDL		- 1	ug/Kg
Chrysere		<mdl< td=""><td></td><td>34.7 ug/Kg</td><td></td><td><mdl< td=""><td>21</td><td>34.5 ug/Kg</td><td></td><td><mdl< td=""><td>5,</td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td></td><td>Į</td><td>ug/Kg</td></mdl<></td></mdl<></td></mdl<></td></mdl<>		34.7 ug/Kg		<mdl< td=""><td>21</td><td>34.5 ug/Kg</td><td></td><td><mdl< td=""><td>5,</td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td></td><td>Į</td><td>ug/Kg</td></mdl<></td></mdl<></td></mdl<>	21	34.5 ug/Kg		<mdl< td=""><td>5,</td><td>34.7 ug'Kg</td><td></td><td><mdl< td=""><td></td><td>Į</td><td>ug/Kg</td></mdl<></td></mdl<>	5,	34.7 ug'Kg		<mdl< td=""><td></td><td>Į</td><td>ug/Kg</td></mdl<>		Į	ug/Kg
Coprostanol		<mdl,g< td=""><td>350</td><td>691 ug/Kg</td><td></td><td></td><td>350</td><td>689 ug/Kg</td><td></td><td><mcl.g< td=""><td>350</td><td>692 ug'Kg</td><td></td><td><mdl.9< td=""><td></td><td></td><td>ug/Kg</td></mdl.9<></td></mcl.g<></td></mdl,g<>	350	691 ug/Kg			350	689 ug/Kg		<mcl.g< td=""><td>350</td><td>692 ug'Kg</td><td></td><td><mdl.9< td=""><td></td><td></td><td>ug/Kg</td></mdl.9<></td></mcl.g<>	350	692 ug'Kg		<mdl.9< td=""><td></td><td></td><td>ug/Kg</td></mdl.9<>			ug/Kg
Dibenzc(a,h)anthracene		<mdl,g< td=""><td>56</td><td>104 ug/Kg</td><td></td><td></td><td>99</td><td>103 ug/Kg</td><td>70</td><td><mel,g< td=""><td>56</td><td>104 ug'Kg</td><td></td><td><mdl,3< td=""><td>Į</td><td>- 1</td><td>ug/Kg</td></mdl,3<></td></mel,g<></td></mdl,g<>	56	104 ug/Kg			99	103 ug/Kg	70	<mel,g< td=""><td>56</td><td>104 ug'Kg</td><td></td><td><mdl,3< td=""><td>Į</td><td>- 1</td><td>ug/Kg</td></mdl,3<></td></mel,g<>	56	104 ug'Kg		<mdl,3< td=""><td>Į</td><td>- 1</td><td>ug/Kg</td></mdl,3<>	Į	- 1	ug/Kg
Dibenzcfuran		-MDL	}	69.3 ug/Kg		<mdl< td=""><td>35</td><td>68.9 ug/Kg</td><td></td><td><mdl< td=""><td>35</td><td>69.2 ug'Kg</td><td></td><td>≺MDL</td><td></td><td></td><td>ug/Kg</td></mdl<></td></mdl<>	35	68.9 ug/Kg		<mdl< td=""><td>35</td><td>69.2 ug'Kg</td><td></td><td>≺MDL</td><td></td><td></td><td>ug/Kg</td></mdl<>	35	69.2 ug'Kg		≺MDL			ug/Kg
Diethyl Phthalate		NDL ×	35	69.3 ug/Kg		¢MDL.	35	68.9 ug/Kg	-	<mdl< td=""><td>3\$</td><td>69.2 ug/Kg</td><td></td><td>≺MDL</td><td></td><td></td><td>ug/Kg</td></mdl<>	3\$	69.2 ug/Kg		≺MDL			ug/Kg
Dimethyl Phthalate		<mdl< td=""><td>4</td><td>20.8 ug/Kg</td><td></td><td>,dMpL</td><td>4</td><td></td><td></td><td><md1< td=""><td>17</td><td>20.8 ug/Kg</td><td></td><td><mdĭ< td=""><td></td><td></td><td>⊔g′Kg</td></mdĭ<></td></md1<></td></mdl<>	4	20.8 ug/Kg		,dMpL	4			<md1< td=""><td>17</td><td>20.8 ug/Kg</td><td></td><td><mdĭ< td=""><td></td><td></td><td>⊔g′Kg</td></mdĭ<></td></md1<>	17	20.8 ug/Kg		<mdĭ< td=""><td></td><td></td><td>⊔g′Kg</td></mdĭ<>			⊔g′Kg
Di-N-Butyl Phthalate		\dW>	35	69.3 ug/Kg		¢MDL	35	68.9 ug/Kg		<mdl< td=""><td>35</td><td></td><td></td><td><mdi.< td=""><td>- 1</td><td>- 1</td><td>ug/Kg</td></mdi.<></td></mdl<>	35			<mdi.< td=""><td>- 1</td><td>- 1</td><td>ug/Kg</td></mdi.<>	- 1	- 1	ug/Kg
Di-N-Octyl Phthatate		<mdl< td=""><td>21</td><td>34.7 ug/Kg</td><td></td><td>¢MDŁ</td><td>21</td><td>34.5 ug/Kg</td><td></td><td><mdl< td=""><td>2.</td><td>34.7 ug'Kg</td><td></td><td>≺MDi</td><td></td><td></td><td>⊔g/Kg</td></mdl<></td></mdl<>	21	34.7 ug/Kg		¢MDŁ	21	34.5 ug/Kg		<mdl< td=""><td>2.</td><td>34.7 ug'Kg</td><td></td><td>≺MDi</td><td></td><td></td><td>⊔g/Kg</td></mdl<>	2.	34.7 ug'Kg		≺MDi			⊔g/Kg
Fluoranhene		<mdl,g< td=""><td>\</td><td>41.6 ug/Kg</td><td></td><td>< MDL, G</td></mdl,g<>	\	41.6 ug/Kg		< MDL, G	21	41.3 ug/Kg	-	<mcl.g< td=""><td>5.</td><td>41.6 ug/Kg</td><td></td><td><mdl,3< td=""><td>- 1</td><td>Į.</td><td>ug/Kg</td></mdl,3<></td></mcl.g<>	5.	41.6 ug/Kg		<mdl,3< td=""><td>- 1</td><td>Į.</td><td>ug/Kg</td></mdl,3<>	- 1	Į.	ug/Kg
Fluorens		<mdl.g< td=""><td>1</td><td>34.7 ug/Kg</td><td></td><td><mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td></td><td><mcl,g< td=""><td>5</td><td>34.7 ug'Kg</td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<></td></mdl.g<>	1	34.7 ug/Kg		<mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td></td><td><mcl,g< td=""><td>5</td><td>34.7 ug'Kg</td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<>	21	34.5 ug/Kg		<mcl,g< td=""><td>5</td><td>34.7 ug'Kg</td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<>	5	34.7 ug'Kg		<mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<>			ug/Kg
Hexachorobutadiene		<mdl,g< td=""><td>35</td><td>69.3 ug/Kg</td><td></td><td><mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td>-</td><td><mcl,g< td=""><td>35</td><td>69.2 ug/Kg</td><td></td><td><mdl,3< td=""><td>- </td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<></td></mdl,g<>	35	69.3 ug/Kg		<mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td>-</td><td><mcl,g< td=""><td>35</td><td>69.2 ug/Kg</td><td></td><td><mdl,3< td=""><td>- </td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<>	35	68.9 ug/Kg	-	<mcl,g< td=""><td>35</td><td>69.2 ug/Kg</td><td></td><td><mdl,3< td=""><td>- </td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<>	35	69.2 ug/Kg		<mdl,3< td=""><td>- </td><td></td><td>ug/Kg</td></mdl,3<>	-		ug/Kg
Hexachorocyclopentadiene		<mdl,g< td=""><td>35</td><td>69.3 ug/Kg</td><td></td><td><mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td></td><td><mcl,g< td=""><td>35</td><td></td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<></td></mdl,g<>	35	69.3 ug/Kg		<mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td></td><td><mcl,g< td=""><td>35</td><td></td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></mdl,g<>	35	68.9 ug/Kg		<mcl,g< td=""><td>35</td><td></td><td></td><td><mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<></td></mcl,g<>	35			<mdl,3< td=""><td></td><td></td><td>ug/Kg</td></mdl,3<>			ug/Kg
Hexachordethane		<mdl,g< td=""><td>١ ١</td><td>69.3 ug/Kg</td><td></td><td><wde,g< td=""><td>35</td><td></td><td>-</td><td><mcl,g< td=""><td></td><td></td><td></td><td><mdl,3< td=""><td>- 1</td><td>- [</td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></wde,g<></td></mdl,g<>	١ ١	69.3 ug/Kg		<wde,g< td=""><td>35</td><td></td><td>-</td><td><mcl,g< td=""><td></td><td></td><td></td><td><mdl,3< td=""><td>- 1</td><td>- [</td><td>ug/Kg</td></mdl,3<></td></mcl,g<></td></wde,g<>	35		-	<mcl,g< td=""><td></td><td></td><td></td><td><mdl,3< td=""><td>- 1</td><td>- [</td><td>ug/Kg</td></mdl,3<></td></mcl,g<>				<mdl,3< td=""><td>- 1</td><td>- [</td><td>ug/Kg</td></mdl,3<>	- 1	- [ug/Kg
Indeno(1, 2, 3-Cd)Pyrene		<mdl,g< td=""><td>١ '</td><td>- 1</td><td></td><td><imdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td>-</td><td><m⊡l,g< td=""><td>1</td><td></td><td></td><td><mdl,3< td=""><td></td><td>1</td><td>g/Kg</td></mdl,3<></td></m⊡l,g<></td></imdl,g<></td></mdl,g<>	١ '	- 1		<imdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td>-</td><td><m⊡l,g< td=""><td>1</td><td></td><td></td><td><mdl,3< td=""><td></td><td>1</td><td>g/Kg</td></mdl,3<></td></m⊡l,g<></td></imdl,g<>	35	68.9 ug/Kg	-	<m⊡l,g< td=""><td>1</td><td></td><td></td><td><mdl,3< td=""><td></td><td>1</td><td>g/Kg</td></mdl,3<></td></m⊡l,g<>	1			<mdl,3< td=""><td></td><td>1</td><td>g/Kg</td></mdl,3<>		1	g/Kg
Isophorane		< M DL.G	۱ ۱	69.1 ug/Kg		<wdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td>15</td><td><mel.g< td=""><td>38</td><td></td><td></td><td><mdl,3< td=""><td></td><td>- 1</td><td>λ/g</td></mdl,3<></td></mel.g<></td></wdl,g<>	35	68.9 ug/Kg	15	<mel.g< td=""><td>38</td><td></td><td></td><td><mdl,3< td=""><td></td><td>- 1</td><td>λ/g</td></mdl,3<></td></mel.g<>	38			<mdl,3< td=""><td></td><td>- 1</td><td>λ/g</td></mdl,3<>		- 1	λ/g
Naphthalene		<#DL,G	99	104 ug/Kg		<mdl g<="" td=""><td>56</td><td>103 ug/Kg</td><td>1</td><td><mdl,g< td=""><td>26</td><td></td><td></td><td><mdl,g< td=""><td>- 1</td><td></td><td>ug/Kg</td></mdl,g<></td></mdl,g<></td></mdl>	56	103 ug/Kg	1	<mdl,g< td=""><td>26</td><td></td><td></td><td><mdl,g< td=""><td>- 1</td><td></td><td>ug/Kg</td></mdl,g<></td></mdl,g<>	26			<mdl,g< td=""><td>- 1</td><td></td><td>ug/Kg</td></mdl,g<>	- 1		ug/Kg
Nitrobenzene		<#DL,G	35	69.3 ug/Kg		<mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td>7</td><td><mdl,g< td=""><td>33</td><td>69.2 ug/Kg</td><td></td><td><mdl,g< td=""><td></td><td></td><td>ug/Kg</td></mdl,g<></td></mdl,g<></td></mdl,g<>	35	68.9 ug/Kg	7	<mdl,g< td=""><td>33</td><td>69.2 ug/Kg</td><td></td><td><mdl,g< td=""><td></td><td></td><td>ug/Kg</td></mdl,g<></td></mdl,g<>	33	69.2 ug/Kg		<mdl,g< td=""><td></td><td></td><td>ug/Kg</td></mdl,g<>			ug/Kg
N-Nitrosodimethylarrine		<mdl< td=""><td>140</td><td>203 ug/Kg</td><td></td><td><mdl< td=""><td>140</td><td>207 ug/Kg</td><td>3</td><td>-WDL</td><td>140</td><td></td><td></td><td>-MDI</td><td></td><td>- 1</td><td>ug/K)</td></mdl<></td></mdl<>	140	203 ug/Kg		<mdl< td=""><td>140</td><td>207 ug/Kg</td><td>3</td><td>-WDL</td><td>140</td><td></td><td></td><td>-MDI</td><td></td><td>- 1</td><td>ug/K)</td></mdl<>	140	207 ug/Kg	3	-WDL	140			-MDI		- 1	ug/K)
N-Nitrosodi-N-Propylamine		<mdl,g< td=""><td>35</td><td>69.3 ug/Kg</td><td></td><td><mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td></td><td><mdl.g< td=""><td>35</td><td>- 1</td><td> </td><td><mdl,g< td=""><td></td><td></td><td>ug/Kg</td></mdl,g<></td></mdl.g<></td></mdl,g<></td></mdl,g<>	35	69.3 ug/Kg		<mdl,g< td=""><td>35</td><td>68.9 ug/Kg</td><td></td><td><mdl.g< td=""><td>35</td><td>- 1</td><td> </td><td><mdl,g< td=""><td></td><td></td><td>ug/Kg</td></mdl,g<></td></mdl.g<></td></mdl,g<>	35	68.9 ug/Kg		<mdl.g< td=""><td>35</td><td>- 1</td><td> </td><td><mdl,g< td=""><td></td><td></td><td>ug/Kg</td></mdl,g<></td></mdl.g<>	35	- 1		<mdl,g< td=""><td></td><td></td><td>ug/Kg</td></mdl,g<>			ug/Kg
N-Nitrosodiphenytamine		<mdl< td=""><td>35</td><td>69.3 ug/Kg</td><td></td><td><mdl< td=""><td>35</td><td>68.9 ug/Kg</td><td>5</td><td>-WDL</td><td>35</td><td>- 1</td><td></td><td>\ VWDI</td><td></td><td></td><td>rg/Kj</td></mdl<></td></mdl<>	35	69.3 ug/Kg		<mdl< td=""><td>35</td><td>68.9 ug/Kg</td><td>5</td><td>-WDL</td><td>35</td><td>- 1</td><td></td><td>\ VWDI</td><td></td><td></td><td>rg/Kj</td></mdl<>	35	68.9 ug/Kg	5	-WDL	35	- 1		\ VWDI			rg/Kj
Pentachlorophenol		<mdl,g< td=""><td>35</td><td>69 3 ug/Kg</td><td></td><td><mdf.g< td=""><td>35</td><td>68 9 ug/Kg</td><td>-</td><td><mdl,g< td=""><td>33</td><td>- 1</td><td></td><td><mdl.g< td=""><td></td><td></td><td>ug/K.j</td></mdl.g<></td></mdl,g<></td></mdf.g<></td></mdl,g<>	35	69 3 ug/Kg		<mdf.g< td=""><td>35</td><td>68 9 ug/Kg</td><td>-</td><td><mdl,g< td=""><td>33</td><td>- 1</td><td></td><td><mdl.g< td=""><td></td><td></td><td>ug/K.j</td></mdl.g<></td></mdl,g<></td></mdf.g<>	35	68 9 ug/Kg	-	<mdl,g< td=""><td>33</td><td>- 1</td><td></td><td><mdl.g< td=""><td></td><td></td><td>ug/K.j</td></mdl.g<></td></mdl,g<>	33	- 1		<mdl.g< td=""><td></td><td></td><td>ug/K.j</td></mdl.g<>			ug/K.j
Phenanthrene	21	<rdl,g< td=""><td>21</td><td>34.7 ug/Kg</td><td></td><td><mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td>-</td><td><mdl,g< td=""><td>5</td><td></td><td></td><td><mdl.g< td=""><td></td><td>- 1</td><td>ug/K;</td></mdl.g<></td></mdl,g<></td></mdl,g<></td></rdl,g<>	21	34.7 ug/Kg		<mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td>-</td><td><mdl,g< td=""><td>5</td><td></td><td></td><td><mdl.g< td=""><td></td><td>- 1</td><td>ug/K;</td></mdl.g<></td></mdl,g<></td></mdl,g<>	21	34.5 ug/Kg	-	<mdl,g< td=""><td>5</td><td></td><td></td><td><mdl.g< td=""><td></td><td>- 1</td><td>ug/K;</td></mdl.g<></td></mdl,g<>	5			<mdl.g< td=""><td></td><td>- 1</td><td>ug/K;</td></mdl.g<>		- 1	ug/K;
Phenol		<mdl,g< td=""><td>140</td><td>203 ug/Kg</td><td></td><td><mdl g<="" td=""><td>40</td><td>207 ug/Kg</td><td>-</td><td><mdl.g< td=""><td>140</td><td>208 ug/Kg</td><td></td><td><mdl.g< td=""><td></td><td>- 1</td><td>ug/Kj</td></mdl.g<></td></mdl.g<></td></mdl></td></mdl,g<>	140	203 ug/Kg		<mdl g<="" td=""><td>40</td><td>207 ug/Kg</td><td>-</td><td><mdl.g< td=""><td>140</td><td>208 ug/Kg</td><td></td><td><mdl.g< td=""><td></td><td>- 1</td><td>ug/Kj</td></mdl.g<></td></mdl.g<></td></mdl>	40	207 ug/Kg	-	<mdl.g< td=""><td>140</td><td>208 ug/Kg</td><td></td><td><mdl.g< td=""><td></td><td>- 1</td><td>ug/Kj</td></mdl.g<></td></mdl.g<>	140	208 ug/Kg		<mdl.g< td=""><td></td><td>- 1</td><td>ug/Kj</td></mdl.g<>		- 1	ug/Kj
Pyrene		<mdl,g< td=""><td>21</td><td>34.7 ug/Kg</td><td></td><td><mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td>-</td><td><mdl.g< td=""><td>2:</td><td>34.7 ug/Kg</td><td></td><td><mdl,g< td=""><td>21</td><td>34.4</td><td>ĽŽ.</td></mdl,g<></td></mdl.g<></td></mdl,g<></td></mdl,g<>	21	34.7 ug/Kg		<mdl,g< td=""><td>21</td><td>34.5 ug/Kg</td><td>-</td><td><mdl.g< td=""><td>2:</td><td>34.7 ug/Kg</td><td></td><td><mdl,g< td=""><td>21</td><td>34.4</td><td>ĽŽ.</td></mdl,g<></td></mdl.g<></td></mdl,g<>	21	34.5 ug/Kg	-	<mdl.g< td=""><td>2:</td><td>34.7 ug/Kg</td><td></td><td><mdl,g< td=""><td>21</td><td>34.4</td><td>ĽŽ.</td></mdl,g<></td></mdl.g<>	2:	34.7 ug/Kg		<mdl,g< td=""><td>21</td><td>34.4</td><td>ĽŽ.</td></mdl,g<>	21	34.4	ĽŽ.
M=OR EPN35508/8270C SM(7-3-01-004)		Ì	į													- L	
		<mdl.g< td=""><td>0.9</td><td>1.73 ug/Kg</td><td></td><td><mdl.g< td=""><td>0.89</td><td>1.72 ug/Kg</td><td>-</td><td><mdl,g< td=""><td>6.0</td><td>1.73 ug/Kg</td><td></td><td><mdl.g< td=""><td></td><td></td><td>ug/Kj</td></mdl.g<></td></mdl,g<></td></mdl.g<></td></mdl.g<>	0.9	1.73 ug/Kg		<mdl.g< td=""><td>0.89</td><td>1.72 ug/Kg</td><td>-</td><td><mdl,g< td=""><td>6.0</td><td>1.73 ug/Kg</td><td></td><td><mdl.g< td=""><td></td><td></td><td>ug/Kj</td></mdl.g<></td></mdl,g<></td></mdl.g<>	0.89	1.72 ug/Kg	-	<mdl,g< td=""><td>6.0</td><td>1.73 ug/Kg</td><td></td><td><mdl.g< td=""><td></td><td></td><td>ug/Kj</td></mdl.g<></td></mdl,g<>	6.0	1.73 ug/Kg		<mdl.g< td=""><td></td><td></td><td>ug/Kj</td></mdl.g<>			ug/Kj
		<mdl.g< td=""><td>0.9</td><td>1.73 ug/Kg</td><td></td><td><mdl.g< td=""><td>0.89</td><td>1.72 ug/Kg</td><td>-</td><td><m0l.g< td=""><td>6.0</td><td></td><td></td><td><mdl,g< td=""><td>0.89</td><td>1.71 u</td><td>ug/K3</td></mdl,g<></td></m0l.g<></td></mdl.g<></td></mdl.g<>	0.9	1.73 ug/Kg		<mdl.g< td=""><td>0.89</td><td>1.72 ug/Kg</td><td>-</td><td><m0l.g< td=""><td>6.0</td><td></td><td></td><td><mdl,g< td=""><td>0.89</td><td>1.71 u</td><td>ug/K3</td></mdl,g<></td></m0l.g<></td></mdl.g<>	0.89	1.72 ug/Kg	-	<m0l.g< td=""><td>6.0</td><td></td><td></td><td><mdl,g< td=""><td>0.89</td><td>1.71 u</td><td>ug/K3</td></mdl,g<></td></m0l.g<>	6.0			<mdl,g< td=""><td>0.89</td><td>1.71 u</td><td>ug/K3</td></mdl,g<>	0.89	1.71 u	ug/K3
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Hexachorobenzene		S OM>	6.0	1.73 ug/Kg	26.0		C.89	1.72 ug/Kg	d	<mdl,g< td=""><td>6.0</td><td>1.73 ug/Kg</td><td></td><td><mdl,g< td=""><td>0.89</td><td>1.71 u</td><td>ug/Kg</td></mdl,g<></td></mdl,g<>	6.0	1.73 ug/Kg		<mdl,g< td=""><td>0.89</td><td>1.71 u</td><td>ug/Kg</td></mdl,g<>	0.89	1.71 u	ug/Kg
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KING COUNTY ENVIRONMENTAL LABORATORY QUALITY ASSURANCE REVIEW

for

ESTUARINE SEDIMENT ANALYTICAL DATA

NORFOLK CSO SEDIMENT REMEDIATION PROJECT FIVE-YEAR MONITORING PROGRAM APRIL 1999 MONITORING EVENT

August 11, 1999

King County Environmental Laboratory 322 West Ewing Street Seattle, Washington 98119-1507 (206) 684-2300

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ESTUARINE SEDIMENT ANALYTICAL DATA

NORFOLK CSO SEDIMENT REMEDIATION PROJECT FIVE-YEAR MONITORING PROGRAM APRIL 1999 MONITORING EVENT

Prepared by:

Fritz Grothkopp Laboratory Project Manager Client Services Section

Reviewed by:

Colin Elliott
Quality Assurance Officer
Client Services Section

August 18, 1999

King County Environmental Laboratory 322 West Ewing Street Seattle, Washington 98119-1507 (206) 684-2300

INTRODUCTION

This quality assurance (QA) review accompanies data submitted in connection with estuarine sediment sampling and analysis conducted by the King County Environmental Laboratory (KC Lab) for the Norfolk Combined Sewer Overflow (CSO) Sediment Remediation Project. The QA review is organized into the four sections listed below.

- General Comments
- Conventional Analyses
- Metal Chemistry
- Organic Chemistry

An overview of the approach used for the QA review is detailed in the *General Comments* section. Additional information specific to each analysis is included in the appropriate analytical section.

This QA review has been primarily conducted in accordance with guidelines established through the Puget Sound Dredged Disposal Analysis (PSDDA) program, outlined in *Puget Sound Dredged Disposal Analysis Guidance Manual*, Data Quality Evaluation for Proposed Dredged Material *Disposal Projects*. Other approaches incorporated in the QA review have been established through collaboration between the King County Environmental Laboratory (KC Laboratory) and the Washington State Department of Ecology (Ecology) Sediment Management Unit.

GENERAL COMMENTS

Scope of Samples Submitted

This QA review is associated with estuarine sediment samples collected in April 1999 as part of the Norfolk CSO Sediment Remediation Project. The five-year monitoring program is designed to monitor the backfill material at the remediation site for possible re-contamination from the Norfolk CSO or other adjacent outfalls.

Except where noted in the subcontracting sections of this QA review, all analyses have been conducted by the KC Lab. Sediment analytical data are reported with associated data qualifiers and have undergone QA1 review, as summarized in this narrative report.

Completeness

Completeness has been evaluated for this data submission and QA review by considering the following criteria:

- Comparing reported data to the planned project analyses summarized in Table 1.
- Compliance with storage conditions and holding times.
- Frequency of analysis of the complete set of quality control (QC) samples outlined in Table 2.

Subcontracted Analyses

Analyses that have been subcontracted and the issues associated with these subcontracted analyses are noted in this narrative.

Methods

Analytical methods are noted in the applicable analytical sections of this QA review.

Target Lists

The reported target lists have been compared to the target analytes listed in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC. Target lists may also be compared to the PSDDA *Chemicals of Concern* list, if applicable.

Detection Limits

The KC Laboratory distinguishes between the reporting detection limit (RDL) and the method detection limit (MDL).

- The RDL is defined as the minimum concentration of a chemical constituent that can be reliably quantified.
- The MDL is defined as the minimum concentration of a chemical constituent that can be detected.

Some subcontracted laboratory data are available with an MDL only, in accordance with the subcontracting laboratory policies. All analytical data are reported with a numeric result and/or detection limit(s).

Storage Conditions and Holding Times

Storage conditions and holding times have been evaluated using guidelines established during the Third Annual PSDDA Review Meeting. The approach used to evaluate Total Organic Carbon for holding time has been established between the KC Laboratory and Ecology during previous QA1 review efforts.

Method Blanks

Method blank results have been used to evaluate the possible laboratory contamination of samples. Method blank results have been reviewed for the presence of analytes detected at or greater than the MDL.

Standard Reference Materials and Check Standards

Standard reference material (SRM) or check standard recoveries have been used to evaluate possible low or high analytical bias on a batch-specific basis. SRM or check standard analysis is included with metal, organic and selected conventional parameters (see Table 2). Standard reference materials are purchased from outside agencies and generally have a certified analyte value. Check standards are generally prepared by the analytical laboratory as part of overall quality control.

Matrix Spikes

Matrix spike recoveries have been used to evaluate possible low or high analytical bias on a matrix and batch-specific basis. Matrix spikes are analyzed with metal, organic and selected conventional parameters (see Table 2).

Laboratory Replicate Samples

Replicate analysis (laboratory duplicates or triplicates) is used as an indicator of method precision and is used to qualify data on an analyte and batch-specific basis. Not all replicate data are used, however, as an indicator for data qualification. Only sets of replicate results that include at least one result significantly greater than the RDL (or the MDL if no RDL is present) are considered for data qualification. These guidelines have been used to account for the fact that precision obtained near the detection limit is not representative of precision obtained throughout the entire analytical range.

<u>Surrogates</u>

Surrogate recoveries have been used to evaluate possible low or high analytical bias on a sample-specific basis. Surrogates are analyzed for organic parameters with the exception of methyl mercury.

Data Qualifiers

The data qualification system used for this data submission is presented in Table 3. These data qualifiers address situations that require qualification and generally conform to QA1 guidance. The KC Laboratory qualifiers indicating <MDL and <RDL have been used as replacements for the T and U qualifier flags specified under QA1 guidance. Changes made to SRM data qualification have been discussed with and approved by the Sediment Management Unit of Ecology.

Units and Significant Figures

Data have been reported in accordance with laboratory policy at the time of data generation. When an RDL and MDL are reported, data have been reported to three significant figures above the RDL and two significant figures equal to or below the RDL. Data with only an MDL have been reported to two significant figures. PSD results are reported to three significant figures.

CONVENTIONAL ANALYSES

Completeness

Conventional data are reported for samples L15421-1 through L15421-4 (Table 1) These samples were analyzed for total organic carbon (TOC), total solids, and particle size distribution (PSD) in association with the complete set of QC samples outlined in Table 2.

Subcontracted Analyses

PSD analysis was subcontracted to AmTest, Inc. in Redmond, Washington.

Methods

PSD analysis was performed in accordance with ASTM and Puget Sound Protocols methodologies (*Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound* - page 9 - PSEP, 1986). TOC analysis was performed in accordance with Standard Method (SM)5310-B. Total solids analysis was performed in accordance with SM2540-G.

Detection Limits, Units and Significant Figures

For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. A positive result and/or MDL and RDL have been reported for all conventional parameters analyzed by the KC Laboratory. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied. This may not apply to subcontracted data.

Storage Conditions and Holding Times

Sample storage conditions and holding times have been evaluated using guidelines established during the Third Annual PSDDA Review Meeting. The criteria used to evaluate storage conditions and holding times for conventional analyses are listed in the table below.

Parameter	Holding Time at 4°C	Holding Time at -18°C
Particle Size Distribution	6 Months	Not Recommended
Solids	14 Days	6 Months
Total Organic Carbon	14 Days	6 Months

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

Method blanks were analyzed in connection with total solids and TOC analyses. All method blanks results were less than the MDL.

Standard Reference Material (SRM)

An SRM (Buffalo River Sediment) was analyzed in connection with TOC analysis. The percent recovery for the SRM analysis was within the 80 to 120% QC limits

Matrix Spikes

Matrix spikes are not analyzed in connection with any of these conventional parameters.

Laboratory Replicate Samples

Laboratory triplicate samples were analyzed for all conventional parameters. The percent relative standard deviations (%RSD) for all triplicate sample results were less than or equal to the 20% QC limit. The overall %RSD for PSD was less than 20%.

METAL CHEMISTRY

Completeness

Metal chemistry data are reported for samples L15421-1 through L15421-4 (Table 1). These samples were analyzed for mercury and other metals in association with the complete set of QC samples outlined in Table 2.

Methods

Mercury analysis was performed in accordance with EPA Method 7471. Analysis for other metals was performed in accordance with EPA Method 3050A/6010B.

Target List

The reported target list includes all metals specified in *Table 1- Marine Sediment Quality Standards Chemical Criteria* and *Table 3- Puget Sound Marine Sediment Cleanup Screening levels Chemical Criteria* contained in Chapter 173-204 WAC. Additional metals have been reported as available.

Detection Limits, Units and Significant Figures

For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. A positive result and/or MDL and RDL have been reported for all metals parameters analyzed by the KC Laboratory. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied.

Storage Conditions and Holding Times

Sample storage conditions and holding times have been evaluated using guidelines established during the Third Annual PSDDA Review Meeting. The criteria used to evaluate storage conditions and holding times for metals analyses are listed in the table below.

Parameter	Holding Time at 4°C	Holding Time at -18°C
Mercury	Not Recommended	28 Days
Other Metals	6 Months	2 Years

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

All metals method blanks results were less than the MDL with the exception of iron. All sample results for iron which are less than 10x the method blank have been qualified with a B flag.

Standard Reference Material (SRM)

The SRM analyzed in association with samples included in this data submission is PACS 1 certified by the National Research Council of Canada (NRCC). This SRM does not contain silver. An SRM recovery less than the QC limit of 80% has not been used to qualify data because the digestion technique used for sample analysis is different from the technique used during analysis to determine the SRM values. Only SRM recoveries greater than 120% will be used to qualify data

All metals SRM recoveries were less than the QC limit of 120% with the exception of cadmium. The reported cadmium SRM recovery was 148%. Associated cadmium sample results have been qualified with an *L* flag.

Matrix Spikes

All matrix spike recoveries were within the 75 to 125% QC limits with the exception of aluminum and manganese. The reported aluminum matrix spike recovery was 171% and the reported manganese matrix spike recovery was 55%. Associated sample results for these metals have been qualified with an L or a G flag, respectively.

Laboratory Replicate Samples

The relative percent differences (RPDs) for laboratory duplicate sample results for all metals were less than or equal to the QC limit of 20%. RPd was not calculated if either one or both of the results was <MDL.

ORGANIC CHEMISTRY

Completeness

Organic chemistry data are reported for samples L15421-1 through L15421-4 (Table 1). These samples were analyzed for base/neutral/acid semivolatile organic compounds (BNAs), chlorobenzenes and polychlorinated biphenyls (PCBs) in association with the complete set of QC samples outlined in Table 2.

Methods

BNA analysis was performed in accordance with EPA Method 8270. A portion of the BNA extract was analyzed by selected ion monitoring (SIM) to attain lower detection limits for chlorobenzene compounds. PCB analysis was performed in accordance with EPA Method 8082.

Target List

The reported BNA target list includes all compounds specified in *Table 1 - Marine Sediment Quality Standards Chemical Criteria* and *Table 3 - Puget Sound Marine Sediment Cleanup Screening Levels Chemical Criteria* contained in Chapter 173-204 WAC with the exception of benzo(j)fluoranthene. The KC Laboratory has verified that analytical conditions are sufficient to calculate a total benzofluoranthene result using the reported *b* and *k* isomers.

The reported chlorobenzene target list includes, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, and hexachlorobenzene.

Reported PCB data include Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Detection Limits, Units and Significant Figures

For analyses performed at the KC Laboratory, data are reported in accordance with laboratory policy at the time the data were generated. A positive result and/or MDL and RDL have been reported for all organic parameters analyzed by the KC Laboratory. Data are reported to three significant figures for results greater than the RDL and two significant figures for results equal to or less than the RDL. For results reported with less than two or three significant figures, significant zeroes are implied.

Storage Conditions and Holding Times

Sample storage conditions and holding times have been evaluated using guidelines established during the Third Annual PSDDA Review Meeting. The criteria used to evaluate storage conditions and holding times for organics analyses are listed in the table below

Parameter	Holding Time at 4°C	Holding Time at -18°C
BNAs & Chlorobenzenes	14 Days to Extract	1 Year to Extract
	40 Days to Analyze	40 Days to Analyze
PCBs	14 Days to Extract	1 Year to Extract
	40 Days to Analyze	40 Days to Analyze

Sample storage conditions and holding times were met for all samples in this data submission.

Method Blanks

All BNA, chlorobenzene, and PCB method blank results were less than the MDL.

Surrogate Recoveries

BNA sample data are qualified when the <u>average</u> surrogate recovery for either or both the acid and base/neutral fractions are outside the 50 to 150% QC limits. Average base/neutral fraction surrogate recoveries were within QC limits for all samples in this data submission. The average acid surrogate fraction recoveries were outside the 50 to 150% QC limits for all samples. Associated acid fraction BNA sample results have been qualified with a *G* flag.

Chlorobenzene sample data are qualified when the <u>single</u> surrogate recovery is outside QC limits. All Chlorobenzene surrogate recoveries were below the 50 to 150% QC limits for all samples in this data submission with the exception of the blank spike duplicate.

PCB sample data are qualified when <u>both</u> surrogate recoveries are outside the 50 to 150% QC limits. At least one PCB surrogate recovery was within QC limits for all samples in this data submission.

Standard Reference Material (SRM)

The sediment SRM analyzed in association with the reported BNA results is 1941a, certified by the National Institute of Standards and Technology (NIST). SRM 1941a contains a partial list of compounds for BNA analysis. BNA results for all samples in this data submission have been qualified based on the SRM recoveries outside the 80 to 120% QC limits, summarized in the following table.

Compound	% Recovery	Flag
Naphthalene	19	G
Fluorene	21	G
Phenanthrene	69	G
Anthracene	65	G
Fluoranthene	66	G
Pyrene	72	G
Benzo(a)anthracene	69	G
Benzo(a)pyrene	59	G
Indeno(1,2,3-c,d)pyrene	41	G
Dibenzo(a,h)anthracene	60	G
Benzo(g,h,i)perylene	25	G

The sediment SRM analyzed in association with the reported PCB results is HS-2, certified by the NRCC. SRM HS-2 contains Aroclor 1254. The SRM recovery for Aroclor 1254 was within the 80 to 120% QC limits.

A sediment SRM is not available for chlorobenzene compounds.

Matrix Spikes

BNA results for all samples in this data submission have been qualified based on the matrix spike recoveries outside the 50 to 150% QC limits, summarized in the following table.

Compound	% Recovery	Flag
Phenol	33	G
Bis(2-Chloroethyl)ether	34	G
2-Chlorophenol	38	G
Bis(2-Chloroisopropyl)ether	34	G
N-Nitrosodi N Propylamine	45	G
Hexachloroethane	44	G
Nitrobenzene	46	G
Isophorone	31	G
2-Nitrophenol	43	O
2,4-Dimethylphenol	3	X
Bis(2-chloroethoxy)methane	46	G
2,4-Dichlorophenol	49	G
Naphthalene	47	G
Hexachlorobutadiene	45	G
Hexachlorocyclopentadiene	26	G
Benzidine	0	Х
3,3'-Dichlorobenzidine	0	Х
Aniline	0	Х
Benzyl Alcohol	22	G
2-Methylphenol	30	G
4-Methylphenol	31	G
4-Chloroaniline	20	G
2-Methylnaphthlene	49	G
3-Nitroaniline	34	G
4-Nitroaniline	39	G
Coprostanol	44	G

Chlorobenzene results for all samples in this data submission have been qualified based on the matrix spike recoveries outside the 50 to 150% QC limits, summarized in the following table.

Compound	% Recovery	Flag
1,3-Dichlorobenzene	49	G
1,4-Dichlorobenzene	48	G
1,2,4-Trichlorobenzene	43	G

Aroclor 1260 is used as the spiking compound for PCB analysis. The Aroclor 1260 matrix spike recovery was within the 50 to 150% QC limits.

Laboratory Replicate Samples
The RPDs for all BNA, chlorobenzene, and PCB laboratory duplicate sample results were less than or equal to the 100% QC limit.

TABLE 1
NORFOLK SEDIMENT BACKFILL MONITORING PROJECT
MARNE SEDIMENT SAMPLE INVENTORY

		İ		
Comments	0 to 10cm sample	0 to 10cm sample	0 to 10cm sample	0 to 10cm sample
PCBs	×	×	×	×
BNAs	×	×	×	×
CIrBenz	×	×	×	×
Metals	×	×	×	×
TOC	×	×	×	×
Solids	×	×	×	×
PSD	×	×	×	×
Locator	NF<501	NF<502	NF<503	NF4504
Sample	L15421-1	L15421-2	L15421-3	L15421-4

TABLE 2 QC SAMPLE FREQUENCY FOR SEDIMENT CHEMICAL AND PHYSICAL PARAMETERS

					SRM or Check	
Parameter	Method Blank	Duplicate	Triplicate	Matrix Spike	Standard	Surrogates
PSD	No	10% of samples	10% of samples	No	No	No
Total Solids	1 per QC batch	5% minimum, 1	5% minimum, 1	No	°N°	o N
		per QC batch	per QC patch			
201	1 per QC batch	5% minimum, 1	5% minimum, 1	<u>0</u>	1 per QC batch	ON N
		per QC batch	per QC batch			
Metals	1 per QC batch	5% minimum, 1	°Z	5% minimum, 1	1 per QC batch	S
		per QC batch		per QC batch		
3NAs	1 per QC batch	5% minimum, 1	No	5% minimum, 1	1 per QC batch	Yes
		per QC batch		per QC batch		
Chlorobenzenes	1 per QC batch	5% minimum, 1	N ₀	5% minimum, 1	°N°	Yes
		per QC batch		per QC batch		
2CBs	1 per QC batch	5% minimum, 1	No	5% minimum, 1	1 per QC batch	Yes
		per QC batch		per QC batch		

TABLE 3
SUMMARY OF SEDIMENT DATA QUALIFIERS

O - 11 - 116 - 116 - 116 -	0			.,	
Condition to Quality	King County Data Qualifier	Organics QC Limits	Metals QC Limits	Conventionals QC Limits	Comment
very low matrix spike recovery	×	< 10 %	< 10 %	< 10 %	
low matrix spike recovery	9	< 50%	< 75%	< 75%	
high matrix spike recovery	-	> 150%	>125%	>125%	
low SRM recovery	9	*%08>	NA	₹%08 >	
high SRM recovery	7	>120%*	>120%*	>123%*	
high duplicate RPD	ш	>100 %	>20%	> 20 %	use duplicate as routine QC for organics
high triplicate RSD	Ш	NA	NA	> 20 %	use triplicate as routine CC for conventionals
less than the reporting detection limit	< RDL	NA	NA	NA	
less than the method detection limit	< MDL	NA	۸۸	NA	
contamination reported in blank	В	> MDL	NDI >	> MDL	
very biased data, based on surrogate recoveries	×	all fraction surrogates are <10%	ĀZ	NA	use average surrogate recovery for BIIA
biased data, based on low surrogate recoveries	9	all fraction surrogates are < 50%	νγ	NA	use average surrogate recovery for BNA
biased data, based on high surrogate recoveries	7	all fraction surrogates are >150%	ZĄ	NA	use average surrogate recovery for BNA
estimate based on presumptive evidence	J# used to indicate the presence of TICs	NA A	Ϋ́	NA	TICs - Tentalively Identified Compounds
rejected, unusable for all purposes	R	NA	NA	NA	
a sample handling criteria has been exceeded	Н	NA	NA	NA	includes container, presevation, hold time, sampling technique
				1	

*Note that PSDDA guidance uses a 95% confidence window for this parameter/qualification.

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CONVENTIONAL ANALYSES QC DATA

KING COUNTY NETRO ENVIRONMENTAL LABORATORY Lab QC Eeport - (6/15/1999 12:20 Run ID: R29943 Vorkgroup: WG42878 (TCC Sediment)

SRM:WC42878-1 Matrix:	OTHR SOLID	Listrype	: CVTOC M	Matrix: OTHR SOLID Listtype: CVTOC Method: SMS314-B {03-04-002-000} Project: PKey: SED	
Parameter	Mdl	1pt	Units	SampValue Truevalue £RM Value & Rec. Qual Limits	RPD/RSD Qual Limits
Total Organic Carbon	រភ	10	mg/Kg	80-120	
MB:WG42878-2 Matrix:	BLANK WTR 1	list(pe:	CVTO: Met	Matrix: BLANK WTR Listt/pe: CVTO: Method: SM5316-B (03-04-(01-000) Project: 423056-160 PKey: SED	
Parameter	Mdl	341	Units	MB Value Qual	
Total Organic Carbon	κè	1	T/Su	TONY	
LD:WG42878-3 IT:WG42878-4 L15421-1 Matrix: SALTWIRSED Listtype:	Li 5421 - 1	Matrix: S	ALTWIRSED	Listtype: CVTOC Mettod: SM5310-B (03-04-002-000) Projec: 423056.160 PKey: SED	
Parameter	Md1	341	Units	SampValue Truevalue ID Value & Rec. Qual Limits Truevalue LT Value & Rec. Qual Limits RPD/RSD	RPD/RSD Qual Limits
Total Organic Carbon	ı.	10	mg/Kg	1220	35
SRM:WC42878-5 Matrix:	OTHR SOLID	Listype	: CVTOC M	Matrix: OTHR SOLID Listype: CVTOC Nethod: SM531(-B (03-04-002-000) Project; PKey: SED	
Parameter	Mđl	4d1	Units	SempValue Truevalue SRM Value % Rec. Qual Limits	D Qual Limits
Total Organic (arbon	ស	10	mg'Kg	53480 32800 98 80~120	
MB:WG42878-6 Matrix:	BLANK WIR	distt/pe:	CVTOC Met	Matrix: BLANK WIR Listt/pe: CVTOC Method. SM5310-B (03-04-(01-000) Project: 423056-150 PKey: SED	
Parameter	MdJ	3d1	Units	ME Value Qual	
Total Organic Carbon	5.	п.	mg/L	ZIOIL S	

KING COUNTY METRO ENVIRONMENTAL LABORATORY
Lab QC Report - 06/15/1999 12:20
Run ID: R29552 Workgroup: WG41906 (tots)

PKey: SED
3056-160
Project 42
FOTS Method: SM2540-B (03-01-007-001)
SM2540-B
Method:
CVTOTS Met
WTR Listtype:
BLANK WTR
Aatrix:
MB: WG12906-1

			Limits	. St
			RPD/RSD Qual Limits	
			RPD/RSD	-
			Limits	
		SED	Qual	
		PKey: SED	* Rec.	
		oject: 423056-160	ruevalue LT Value	78.5
		01) Pro	its D	
		Method: SM2540-G (03.01-007-001) Project: 423056-160	Truevalue ID Value & Rec. Qual Limits Truevalue IT Value & Rec. Qual Limits	
		CS Method: SM2:	ralue ID Value	77.8
Oral		: CVICIS	e True	
MB Value	1 0	Listrype	SampValu	77.6
Inits MB Value	mg/L	SALTWIRSED	Mdl Rdl Units SampValue	مين
Mdl Rdl	el .	Matrix:	Rd1	10. 203.
Mdl	n,	L15421-4	Mdl	500.
		LD:WG42906-2 LT:W342906-3 L15421-4 Matrix: SALTWTRSED Listcype:		
Parameter	Total Solids	LD:WG12906-2	Parameter	Total Solids

Sediment Particle Size Distribution QC data

Particle s	ize				Average	SD	%RSD	Ave %RSD
-2	≺0.1	≺ 0.1	≺0 .	1	#DIV/0!	#DIV/0!	#DIV/0!	
-1		0.4	0.4	0.1	0.3	0.173205	57.73503	
0		1	1.1	1.3	1.133333	0.152753	13.47816	
+1		28	24.8	26.9	26.50067	1.625833	6.119824	
+2		55	56.2	56.9	56.03333	0.960902	1.714876	
+3		9	8.5	9.2	8.9	0.360555	4.051181	
+4		1.3	1.3	1.4	1.333333	0.057735	4.330127	
+5		5.4	7.7	4	5.7	1.868154	32.77463	17.17198
+6	<0.1	<0.1	<0.	1	#DIV/0!	#DIV/0!	#DIV/0!	
÷7	≺ 0.1	≺0.1	≺0 .	1	#DIV/0!	#DIV/0!	#DIV/0!	
+8	<0.1	<0.1	<0.	1	#DIV/0!	#DIV/0!	#DIV/0!	
+9	<0.1	<0.1	<0.	1	#DIV/0!	#DIV/0!	#DIV/0!	
110	≺0.1	<0.1	<0.	1	#DIV/0!	#DIV/0!	#DIV/0!	
>+10	< 0.1	<0.1	<0.	1	#DIV/0!	#DIV/0!	#DIV/0!	

AVITEST

May 4 1999

AmTest Inc.

14603 N.E. 87th St. Redmond, WA 98052

Tel: 425 885 1664

Fax: 425 883 3495

King County WPCD Env. Lab. Subcontracting Dept. MS-LAB 322 West Ewing Street Seattle, WA 98119-1507 Attention: Fritz Grothkopp

Dear Fritz Grothkopp:

Enclosed please find the analytical data for your project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AM TEST ID	TEST
L15421-1 L15421-2 L15421-3 L15421-4	Sediment Sediment	99-A006406 CONV, 99-A006407 CONV, 99-A006408 CONV, 99-A006409 CONV,	GR SIZE, GR SIZE,

Your four (4) samples were received on Monday, April 26 1999. This was a total of 72 hours (3 days) after sample collection (4/23/99). At the time of receipt, the samples were logged in and properly maintained prior to their subsequent analyses.

The analytical procedures used at Am Test are well documented, and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the QC results and "Methodology Report". This table includes information relative to the detection limits, analyses dates and method references.

Please note that the detection limits that are listed in the body of the report refer to the Method Detection Limits (MDL's), as opposed to Practical Quantitation Limits (PQL's).

If you should have any questions pertaining to the data package, please feel free to contact me.

Sincerely,

Mark A. Fugiel General Manager

Project #: 423056-160 PO Number: 108677

BACT = Bacteriological MET = Metals CONV = Conventionals ORG = Organics